

The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* BORIS Y. SHEKUNOV,  
PRATIBHASH CHATTOPADHYAY  
and JEFFREY S. SEITZINGER

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Appeal 2007-0414  
Application 10/691,113  
Technology Center 1700

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Decided: January 29, 2007

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Before EDWARD C. KIMLIN, PETER F. KRATZ, and  
CATHERINE Q. TIMM, *Administrative Patent Judges*.  
KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-19 and 21-37.

Claim 1 is illustrative:

1. A method of producing particles comprising the steps of:  
providing a supercritical fluid;

providing a first solution, the first solution comprising a first solute dissolved or dispersed in a first solvent that is at least partially soluble in the supercritical fluid;

flowing the supercritical fluid through a chamber having a rotating rotor disposed therein;

dispensing the first solution into a mixing zone within the chamber while the supercritical fluid is flowing through the chamber, the mixing zone being defined as a space between an inner wall of the chamber and an adjacent surface of the rotating rotor; and

collecting precipitated particles of the first solute from a mixture comprising the supercritical fluid and the first solvent.

The Examiner relies upon the following references:

Holl	US 6,471,392 B1	Oct. 29, 2002
Johnson	US 2004/0091546 A1	May 13, 2004

Appellants' claimed invention is directed to a method of producing particles comprising dispensing a first solution into a mixing zone of a chamber having a rotating rotor while a supercritical fluid is flowing through the chamber. The mixing zone is the space between the inner wall of the chamber and an adjacent surface of the rotating rotor. Particles are precipitated from a mixture comprising the first solution and supercritical fluid.

Appealed claims 1-5, 7-19, and 21-37 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Johnson. Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Johnson in view of Holl.

In accordance with the grouping of claims set forth by Appellants, claims 1-5, 7, 8, 10-13, and 15-19 stand or fall together with claim 1, whereas claims 21-37 stand or fall together with claim 21.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we find that the Examiner's rejections are supported by the prior art evidence relied upon and, therefore, well founded. Accordingly, we will sustain the Examiner's rejections for essentially those reasons expressed in the Answer.

We consider first the Examiner's § 102 rejection over Johnson. We agree with the Examiner that Johnson fairly describes a method and apparatus for forming particles with a supercritical fluid within the meaning of § 102. We find no error in the Examiner's finding that Johnson discloses

providing a 1<sup>st</sup> solution with dissolved solute (paragraphs 34 and 36), providing an antisolvent that may be supercritical carbon dioxide (paragraphs 58 and 63), flowing the fluids through a chamber or vessel containing a rotor to mix (paragraph 41) and mixing in the annular space between rotor and vessel wall to collect precipitated particles (paragraph[s] 41 and 58).

(Answer 4, third para.). Appellants argue that Figure 1 of Johnson does not include a rotating rotor, but Appellants concede that Johnson expressly teaches that the mixing vessel could be a rotor stator mixer (para. [0041]). Also, as pointed out by the Examiner, Johnson discloses that "[t]he streams are forced to the walls of the mixing vessel by centripetal forces" thereby fairly describing the claimed mixing zone being defined as a space between an inner wall of the chamber and an adjacent surface of the rotating rotor

through which the liquid flows.(para. [0041]). Hence, we find no merit in Appellants' argument that "[w]hile the batch flash mixer of Johnson et al. does contain a rotating mechanical agitator or rotor disposed in a mixing vessel, the non-process solvent does not flow through the mixing vessel as required by the claimed method" (principal Br. 6, penultimate para.).

We are also not persuaded by Appellants' argument that paragraph [0063] of Johnson only relates to using supercritical fluid extraction for post treatment processes (*see* principal Br. 7). Rather, Johnson clearly teaches that although supercritical fluid extraction typically occurs after nanoparticle formation, it can also be employed "during the nanoparticle formation process" (para. [0063], last sentence).

Appellants also maintain that Johnson does not disclose the claim 9 recitation that the first and second solution ports are coaxial. However, we concur with the Examiner that paragraph 0045 of Johnson teaches that the mixer can include multiple inlet tubes for introducing a plurality of streams and that, in one embodiment, "the fluid streams can be directed towards each other to substantially cause them to collide and mix." In our view, this disclosure fairly describes the claimed coaxial ports. As for the claim 14 recitation that the process solvent could be an emulsion, Johnson fairly describes as much by disclosing the addition of emulsifiers to the process solvent (para. [0064], l. 7).

Although Appellants agree that Johnson discloses "forming coated additive target molecules that could have a core-shell configuration,

[Appellant contends] that the manner in which Johnson et al. teach the formation of such coated additive target molecules does not anticipate claims 16 and 21-37” (principal Br. 11, second para.). Appellants maintain that the additive target molecule of Johnson is mixed with the amphiphilic copolymer in the process solvent prior to precipitation, but Johnson does not teach that “the additive target molecule and the amphiphilic copolymer should be headed into a mixing zone as separate solution streams as claimed” (*id.*). However, as pointed out by the Examiner, paragraph [0045] of Johnson expressly states that “[i]n one embodiment of the invention, amphiphilic copolymer and additive target molecule are introduced into the mixing vessel via different solvent streams” (emphasis added).

Consequently, we find that this argument of Appellants is also without merit.

In essence, it is our finding that although Johnson does not provide a figure or example which describes all the features of the claimed process, we agree with the Examiner that Johnson, as a whole, fairly describes the claimed method within the meaning of § 102.

As for the § 103 rejection of claim 6 over Johnson in view of Holl, we fully concur with the Examiner that Holl evidences the obviousness of spacing the surface of the rotating rotor at a distance of 0.1 mm to about 2.5 mm from the inner wall of the chamber. Appellants have not refuted the Examiner’s finding that such spacing was known in the art to avoid introducing Taylor vortices in order to facilitate a more complete, uniform mixing of the introduced solutions (*see* Answer 7, last sentence). We also

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note that Appellants base no argument on unexpected results attributed to the claimed spacing.

One final point remains. In the event of further prosecution of the subject matter at bar, such as by way of a continuing application, the Examiner should also consider rejecting the appealed claims under 35 U.S.C. § 103 based on the Johnson disclosure.

In conclusion, based on the foregoing, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv) (2004).

AFFIRMED

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